

**FEASIBILITY STUDY**  
**Widening of I-77 From South of NC 73 to I-40**

**Mecklenburg/Iredell Counties**

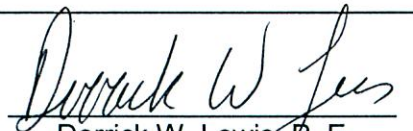
**Division 10/12**

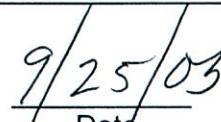
**FS-0112B**

**Prepared For:**

N.C. Department of Transportation



  
Derrick W. Lewis, P. E.  
Feasibility Studies Unit Head

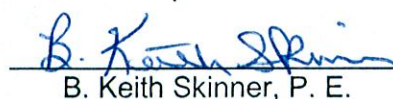
  
Date

**Prepared By:**



Rummel, Klepper & Kahl, LLP  
5800 Faringdon Pl., Suite 105  
Raleigh, NC 27609  
Ph: 919-878-9560 Fax: 919-790-8382

  
J. T. Peacock, Jr., P. E.  
Senior Associate

  
B. Keith Skinner, P. E.  
Associate

  
Date

**Widening of I-77**  
**Mecklenburg/Iredell Counties**  
**Division 10/12**  
**FS-0112B**

**I. General Description**

This feasibility study describes the proposed widening of I-77 from the I-3311B project, which ends south of NC 73 near Huntersville in Mecklenburg County to I-40 near Statesville in Iredell County. This study addresses widening I-77 from the existing four-lane freeway to a basic eight-lane freeway. The median width is variable but the majority of this project will have a 22-foot median with a concrete median barrier. The proposed widening of I-77 will have an approximate length of 27 miles. See Figure 1 for a vicinity map showing the project's location.

The recommended cross section is an eight-lane roadway designed to interstate standards. The existing roadway will be reconstructed by total slab replacement of the existing pavement with a full depth concrete pavement structure. See Figure 2 for the typical cross sections for these proposed improvements. The median width for the proposed typical sections will vary along the project since the existing median width is also variable. The sections of I-77 from approximately 4,630 feet south of SR 2145 (Sam Furr Road) to 3,600 feet north of SR 2147 (Westmoreland Road), from 500 feet north of SR 1302 (Cornelius Road) to existing rest stop at Lake Norman, and from 3,250 feet north of SR 1001 (Ostwalt Amity Road) to 3,900 feet south of SR 2342 (Amity Hill Road) all have a minimum existing median width of 70 feet. These sections will allow widening to the inside to achieve the proposed eight-lane section. The sections of I-77 from 3,400 feet north of SR 1102 (Langtree Road) to 900 feet south of SR (Amity Hill Road), from 3,600 feet north of SR 2147 (Westmoreland Road) to 3,400 feet north of SR 1102 (Langtree Road) and from 900 feet south of SR 2342 (Amity Hill Road) to I-40 have an existing width of 46 feet, 36 feet and 30 feet; respectfully, therefore widening will be needed on the outside as well as the median side to achieve the proposed typical section.

All existing bridges on I-77 will need to be widened or replaced due to the construction of additional travel lanes. Also, some of the existing -Y- line bridges over I-77 will have to be replaced due to the widening of I-77. Table I lists each location of the bridges to be impacted by this widening project and describes whether or not the bridge is to be widened or replaced.

**TABLE I**

<b>LOCATION</b>	<b>MAINLINE BRIDGES TO BE WIDENED</b>	<b>-Y- LINE BRIDGES TO BE REPLACED</b>
Lake Norman	✓	
US 21	✓	
Abandoned Southern Railroad	✓	
Third Creek	✓	
Fourth Creek	✓	
Southern Railroad		✓
SR 2320 (Murdock Road)		✓
NC 73		✓
US 70		✓
SR 2158 (Griffith Street)		✓
SR 1102 (Langtree Road)		✓
SR 1109 (Centre Church)		✓
<b>LOCATION</b>	<b>MAINLINE BRIDGES TO BE WIDENED</b>	<b>-Y- LINE BRIDGES TO BE REPLACED</b>

SR 1100 (Mayhew Road)		✓
NC 150		✓
SR 1302 (Cornelius Road)		✓
SR 1311 (Rankinhill Road)		✓
SR 1312 (Flower House Loop)		✓
SR 2375 (Houston Road)		✓
SR 1001 (Ostwalt Amity Road)		✓
SR 2342 (Amity Hill Road)		✓
SR 2321 (East Broad Street)		✓
US 64		✓

Many of the existing interchanges along the study corridor will need to be reconstructed as a result of the proposed widening as well as to accommodate the projected traffic. Consideration should be given to converting the I-73, US 21 (Exit 33), and NC 150 interchanges into “single-point urban” interchanges. The bridge at the interchange with SR 2342 will need to be rebuilt to accommodate the new I-77 cross section. The interchanges at US 70 and SR 2320 will need to be reconstructed to include collector distributor lanes in order to minimize the adverse impacts of weaving vehicles on I-77. The interchange at SR 2321 currently contains substandard loop radii. Therefore, we recommend the loop located in the northwest quadrant be enlarged and the loop on the southeast quadrant eliminated. A ramp will need to be added in the northeast quadrant of this interchange.

It should be noted that, in later planning stages of this project, a more detailed investigation of the abandoned Southern Railroad should be conducted to determine if the existing dual bridges over the abandoned railroad needs to be widened or removed completely and replaced with a fill section. Also, the existing causeway at Lake Norman will need to be widened to accommodate the eight lane cross section. Rock embankment and plating are recommended in this area.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including costs, and to identify potential problems that may require consideration in the planning and design phases.

## II. Need for Project

The purpose of this project is to reduce congestion along I-77 between NC 73/SR 2145 (Sam Furr Road) and I-40 in Mecklenburg/Iredell Counties by constructing two additional lanes in each direction increasing the total travel lanes in each direction to four. These improvements will also address safety concerns for this major route between the cities of Huntersville and Statesville in North Carolina. The proposed median concrete barrier should eliminate the potential for head on collisions by vehicles passing across the median. Also, the newly constructed bridges over I-77 should not have shoulder piers, which will greatly reduce “roadside hazards” along the project. The proposed typical section will also increase the inside paved shoulders on I-77 from 4 feet to 10 feet allowing stalled vehicles in the inside lane to completely leave the travel lanes.

The three-year accident analysis for the length of this project indicates a severity index of 6.45, which is slightly above the statewide average of 6.14 (for rural interstates).

## III. Traffic Control During Construction

Because of the high traffic volumes on I-77, two lanes in each direction will need to be maintained during construction. As a result, traffic will need to be shifted to the shoulders during construction. Therefore, full depth paved shoulders will be required along I-77.

Maintaining traffic while bridges over I-77 are being rebuilt is also required. It is recommended that temporary detour bridges be constructed at SR 2158 (Griffith Street), SR 1302 (Cornelius Road), SR 1311 (Rankinhill Road), SR 1312 (Flower House Loop), SR 2375 (Houston Road), SR 1001 (Ostwalt Amity Road), SR 2321 (East Broad Street) and US 64. All of these locations will require construction easements for the temporary bridges. It is also recommended that the existing bridge at SR 2342 (Amity Hill Road) be used as a detour while a new bridge is built adjacent to the existing structure. As a result, a slight realignment of SR 2342 will be necessary, but should not require additional right-of-way or a change in the design speed of the roadway.

#### **IV. Traffic Operations**

The purpose of this section is to explain the status of future traffic operations for the proposed facility and to recommend additional measures needed to ensure that traffic would operate at acceptable levels of service (LOS).

The estimated base year 2005 Average Daily Traffic (ADT) volumes for this study section of I-77 range from 53,460 to 88,500 vehicles per day (vpd). The estimated design year 2025 ADT volumes range from 80,900 to 128,700 vpd.

According to NCDOT guidelines, projects should be designed to operate at least at a LOS D in the design year (2025). All segments within this study area meet this criteria for the design year utilizing an 8-lane, divided, interstate type cross section.

#### **V. Costs**

Table II illustrates the estimated construction and right-of-way costs for this proposed project. For this study, the costs were broken up into three sections as shown below:

**TABLE II**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>LENGTH (Miles)</b>	<b>CONSTRUCTION COST</b>	<b>R/W COST</b>	<b>TOTAL COST</b>
<b>1</b>	From NC 73/SR 2145 (Furr Road) to About 2 Miles South of the US 70/I-77 Interchange	22.5	\$402,500,000	\$15,500,000	\$418,000,000
<b>2</b>	From about 2 Miles South of the US 70/ I-77 Interchange to the I-40/I-77 Interchange	4.5	\$119,500,000	\$27,000,000	\$146,500,000
<b>3</b>	Proposed SPUI Modifications for the NC 73/-I77 Interchange (FS-0310B)	N/A	\$27,000,000	\$6,500,000	\$33,500,000
<b>TOTALS:</b>		<b>27.0</b>	<b>\$549,000,000</b>	<b>\$49,000,000</b>	<b>\$598,000,000</b>

#### **VI. Other Alternatives Studied**

Widening the existing four-lane section of I-77 to a six-lane section was also considered for the corridor. The widening for this alternative would occur in the median. To determine if this section would operate at an acceptable LOS in the design year 2025, the "Multilane Module" of the HCS2000 software package was used to analyze sections of the corridor study. It was determined that all sections would operate a LOS F for the design year 2025 except for the section of roadway between NC 150 and US 21. Typically, capacity for roadways is acceptable in a range from LOS A to D. Since the majority of the six-lane study operates at a LOS F in the design year 2025, this alternative is not acceptable. Also, since a full depth section of roadway is needed to the outside for traffic control purposes utilizing this pavement for an eight-lane section would be more appropriate.

A proposed rail line within the I-77 corridor was also considered. However, to accommodate a rail line, it was determined that the study area would need massive reconstruction including all bridges and interchanges. Therefore it was determined that the analysis and study required for a possible rail corridor along I-77 was beyond the scope of this feasibility study.

## **VII. TIP Projects In The Vicinity**

The following TIP Projects are located in the vicinity of this feasibility study project (FS0112B):

**I-3819:** I-40/I-77, modifications of interchange area. This project includes I-2514, (SR 2171, Jane Sowers Road) convert grade separation to an interchange.

**I-4411:** SR 1102 (Langtree Road), convert grade separation to an interchange.

**R-3833:** SR1100 (Brawley School Road) from SR 1177 (River Loop Road) to US 21, widen to Multi-lanes with Interchange at I-77

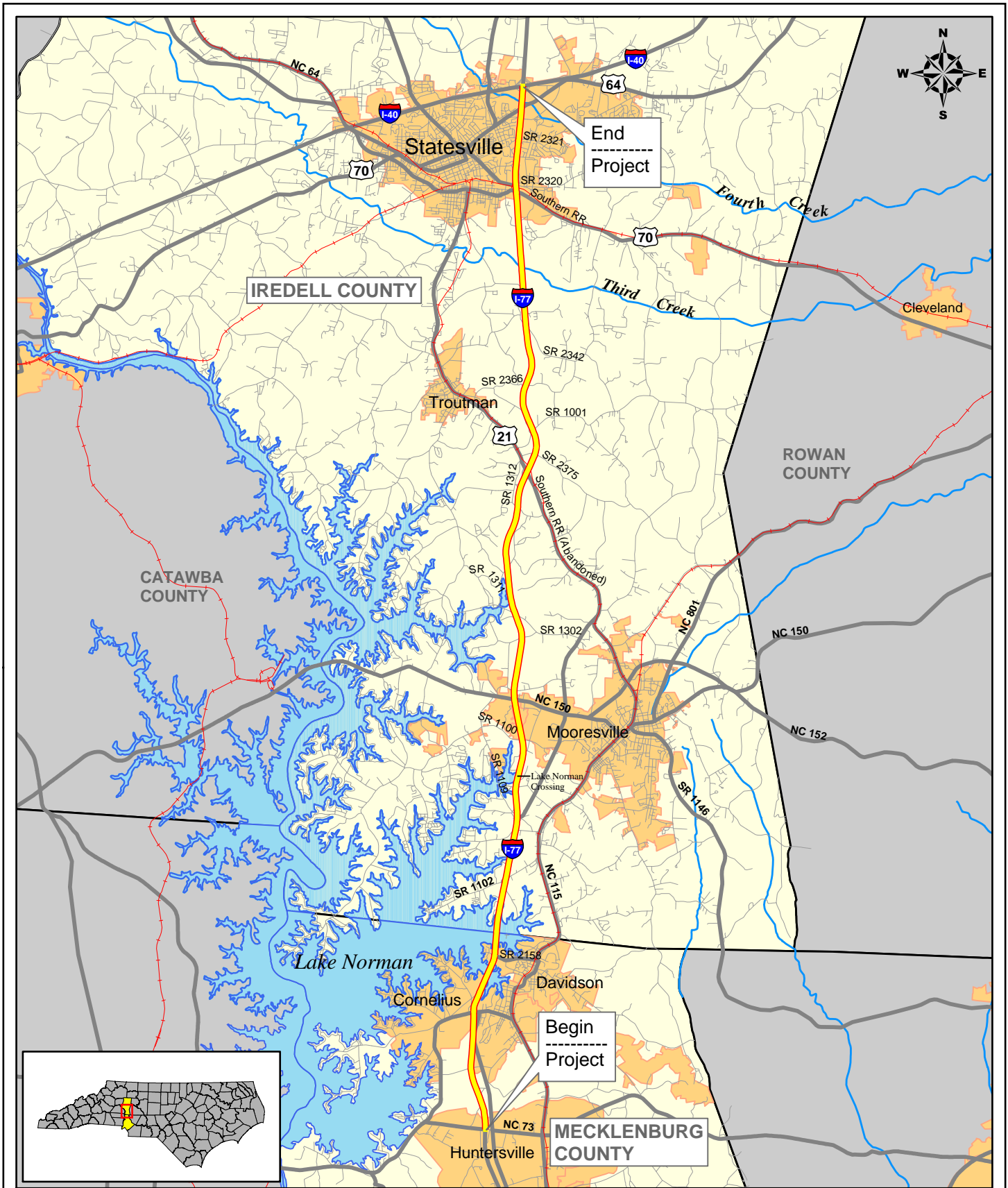
**I-3311:** I-77, add additional lanes from 5<sup>TH</sup> Street in Charlotte to NC 73 (Sam Furr Road).

**R-2555:** SR 5544 (West Catawba Avenue), widen to five (5) lanes from NC 73 (Sam Furr Road) to East of SR 2195 (Torrence Chapel Road).

## **VIII. Additional Comments**

An exhaustive environmental screening was not conducted for this study. However, the following items were identified as needing more detailed analyses during future planning and/or design phases:

- Maintenance of existing traffic for all bridge replacements along the project.
- Future Yadkin - Pee Dee River Buffer Rules will have to be accommodated.
- Careful study of all weaving areas between the US 70 and SR 2320 (Murdock Road) Interchanges.
- Investigation of the abandoned Southern Railroad.

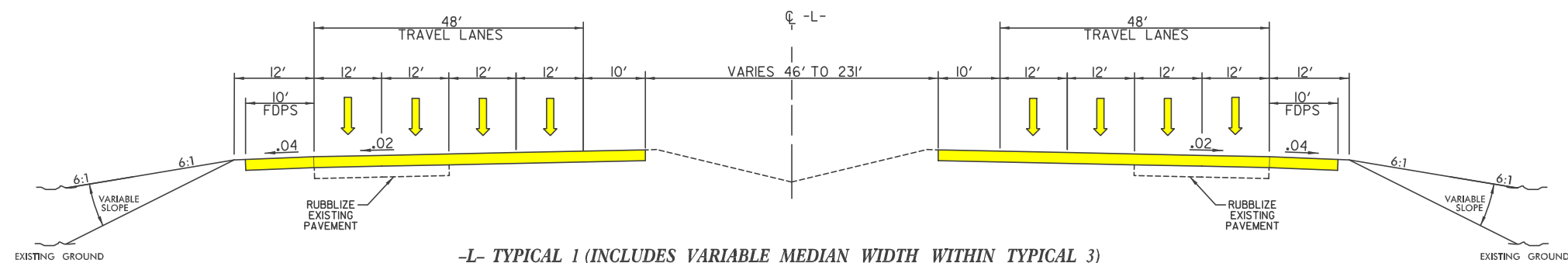


# I-77 Widening Just South of NC 73 North to I-40

Figure 1

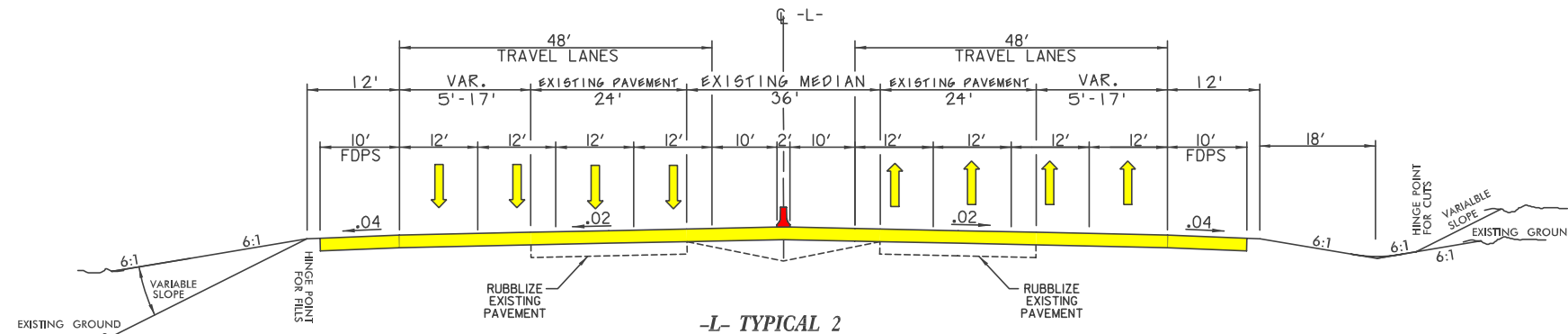






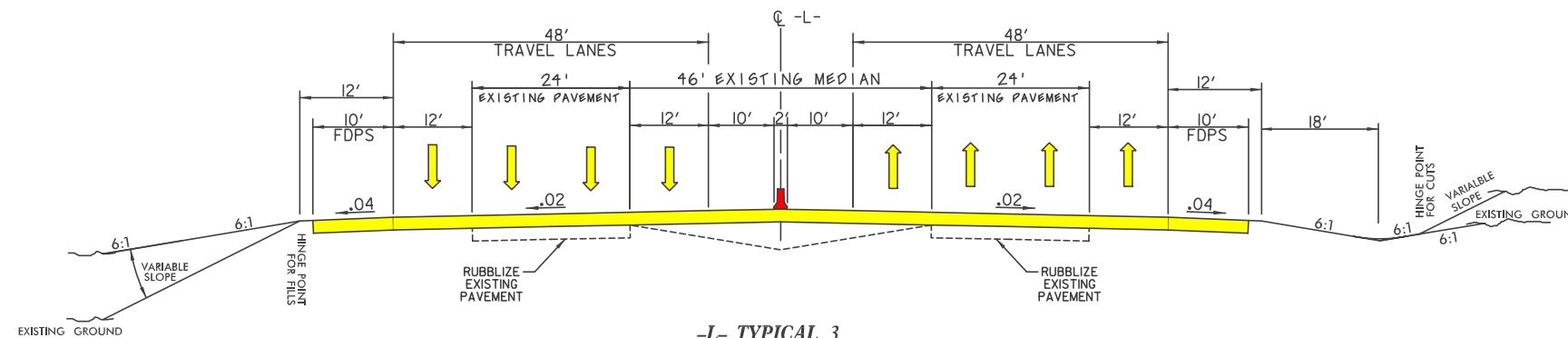
**-L- TYPICAL 1 (INCLUDES VARIABLE MEDIAN WIDTH WITHIN TYPICAL 3)**

FROM 4,630 FT SOUTH OF SR 2145 (FURR RD.) TO 3,600 FT NORTH OF SR 2147 (WESTMORELAND RD.)  
 FROM 500 FT NORTH OF SR 1302 (CORNELIUS RD.) TO EXISTING REST STOP AT LAKE NORMAN  
 FROM 3,250 FT NORTH OF SR 1001 (OSTWALT AMITY RD.) TO 3,900 FT SOUTH OF SR 2342 (AMITY HILL RD.)



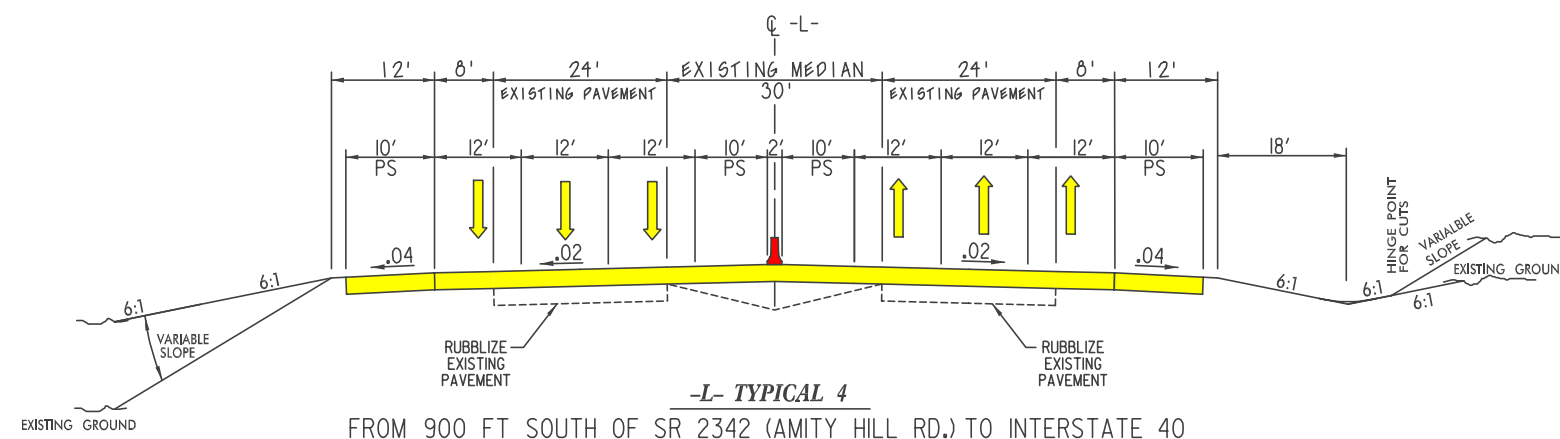
**-L- TYPICAL 2**

FROM 3,600 FT NORTH OF SR 2147 (WESTMORELAND RD.) TO 3,400 FT NORTH OF SR 1102 (LANGTREE RD.)



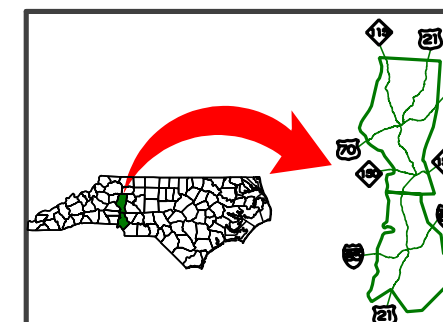
**-L- TYPICAL 3**

FROM 3,400 FT NORTH OF SR 1102 (LANGTREE RD.) TO 900 FT SOUTH OF SR 2342 (AMITY HILL RD.)



**-L- TYPICAL 4**

FROM 900 FT SOUTH OF SR 2342 (AMITY HILL RD.) TO INTERSTATE 40



## TYPICAL SECTIONS FOR I-77 WIDENING IREDELL COUNTY

**FIGURE 2**



RUMMEL, KLEPPER & KAHL LLP  
 consulting engineers  
 RALEIGH, NORTH CAROLINA

PROGRAM DEVELOPMENT BRANCH  
 N.C. DEPARTMENT OF TRANSPORTATION  
 P.O. BOX 25201  
 RALEIGH, NC 27611

